CLAIMS

We claim:

1	A computerized system for designing, deploying, modifying, or
2	maintaining a communications network, comprising:
3	a computer generated model of a physical environment in which
4	said communications network is or will be deployed, said computer
5	generated model providing a three-dimensional representation of locations
6	of components within said physical environment;
7	a server computer or computers for running a computer program
8	which generates said computer generated model;
9	at least one portable computer which acts as a client to said server;
10	means for downloading and storing at least a portion of said
11	computer generated model from said server to said portable computer for
12	displaying said three dimensional representation on said portable
13	computer; and
14	a display associated with said portable computer for displaying said
15	three dimensional pictorial representation.
1	2. The computerized system of claim 1 wherein said portable computer is
2	a hand-held computer.
1	3. The computerized system of claim 1 wherein said three-dimensional
2	representation is constructed from a collection of two-dimensional
3	representations.

1	4. The computerized system of claim 1 wherein said physical environment
2 .	is a building and said three dimensional representation includes at least
3	one floor plan of said building.
1	5. The computerized system of claim 4 wherein said three dimensional
2	representation includes a plurality of floor plans for a plurality of floors in
3	said building, and wherein said portable computer includes a means for
4	selecting specific floor plans of said plurality for displaying on said
5	display.
1	6. The computerized system of claim 1 wherein said physical environment
2	is a campus of buildings and said three dimensional representation
3	includes at least one floor plan for each of a plurality of buildings in said
4	campus, and wherein said portable computer includes a means to select a
5	building within said campus of buildings and to display said at least one
6	floor plan for said building selected.
1	7. The computerized system of claim 6 wherein said three dimensional
2	representation includes a plurality of floor plans for a plurality of floors for
3	said building selected.
1	8. The computerized system of claim 1 wherein said components are
2	selected from the group consisting of base stations, base station
3	controllers, amplifiers, attenuators, antennas, coaxial cabling, fiber optic
4	cabling, connectors, splitters, repeaters, transducers, converters, couplers,

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5	leaky feeder cables, hubs, switches, routers, firewalls, power distribution
6	lines, copper wiring, twisted pair cabling, and wireless access points.
1	9. The computerized system of claim 1 wherein said communications
2	network includes wireless communication devices.
1	10. The computerized system of claim 1 wherein said physical
2	environment is an outdoor area having three dimensional topology and
3	said three dimensional representation includes a representation of said
4	three dimensional topology.
1	11. The computerized system of claim 1 wherein a position-tracking
2	device is used to determine position within said physical environment.
1	12. The computerized system of claim 1 wherein said communication
2	network components are maintained in a bill of materials.
1	13. A computerized system for designing, deploying, modifying, or
2	maintaining a communications network, comprising:
3	a computer generated model of a physical environment in which
4	said communications network is or will be deployed, said computer
5	generated model providing a representation of locations of components
6	within said physical environment, and wherein said computer generated

model provides for performance prediction of said communications

network based on factors selected from the group consisting of choice of

components to be used within said environment, choice of locations for

10	said components with said environment, and orientation of said
11	components at said locations;
12	a server computer or computers for running a computer program
13	which generates said computer generated model;
14	at least one portable computer which acts as a client to said server;
15	means for downloading and storing at least a portion of said
16	computer generated model from said server to said portable computer for
17	displaying said representation on said portable computer; and
18	a display associated with said portable computer for displaying said
19	representation and said performance prediction results.
1	14. The computerized system of claim 13 further comprising:
2	a means for inputting changes to said factors for said at least a
3	portion of said computer generated model on said portable computer
4	which is downloaded from said server; and
5	a means for uploading said changes to said server.
1	15. The computerized system of claim 13 further comprising:
2	a means for inputting changes to said factors for said at least a
3	portion of said computer generated model on said portable computer
4	which is downloaded from said server; and
5	a means for outputting predicted performance parameters of said
6	communications network based on said inputted changes on said display
7	of said portable computer.

16. The computerized system of claim 13 wherein said communications

2 network includes wireless communication devices.

- 1 17. The computerized system of claim 13 wherein said portable computer
- 2 is a hand-held computer.
- 1 18. The computerized system of claim 13 wherein said representation is
- 2 three-dimensional.
- 1 19. The computerized system of claim 13 wherein said representation is
- 2 constructed from a collection of two-dimensional representations.
- 1 20. The computerized system of claim 13 wherein said physical
- 2 environment is a building and said representation includes at least one
- 3 floor plan of said building.
- 1 21. The computerized system of claim 20 wherein said representation
- 2 includes a plurality of floor plans for a plurality of floors in said building,
- and wherein said portable computer includes a means for selecting specific
- 4 floor plans of said plurality for displaying on said display.
- 1 22. The computerized system of claim 13 wherein said physical
- 2 environment is a campus of buildings and said representation includes at
- least one floor plan for each of a plurality of buildings in said campus, and
- 4 wherein said portable computer includes a means to select a building
- 5 within said campus of buildings and to display said at least one floor plan
- 6 for said building selected.

1	23. The computerized system of claim 22 wherein said pictorial
2	representation includes a plurality of floor plans for a plurality of floors for
3	said building selected.
1	24. The computerized system of claim 13 wherein said components are
2	selected from the group consisting of base stations, base station
3	controllers, amplifiers, attenuators, antennas, coaxial cabling, fiber optic
4	cabling, connectors, splitters, repeaters, transducers, converters, couplers,
5	leaky feeder cables, hubs, switches, routers, firewalls, power distribution
6	lines, copper wiring, twisted pair cabling, and wireless access points.
1	25. The computerized system of claim 13 wherein said physical
2	environment is an outdoor area having three dimensional topology and
3	said pictorial representation includes a representation of said three
4	dimensional topology.
1	26. The computerized system of claim 13 wherein a position-tracking
2	device is used to determine position within said physical environment.
1	27. The computerized system of claim 13 wherein said communication
2	network components are maintained in a bill of materials.
1	28. A computerized system for designing, deploying, modifying, or
2	maintaining a communications network, comprising:
3	a computer generated model of a physical environment in which

said communications network is or will be deployed, said computer

5	generated model providing a representation of locations of components
6	within said physical environment;
7	a server computer or computers for running a computer program
8	which generates said computer generated model;
9	at least one portable computer which acts as a client to said server;
10	means for downloading and storing at least a portion of said
11	computer generated model from said server to said portable computer for
12	displaying said representation on said portable computer;
13	a display associated with said portable computer for displaying said
14	representation;
15	a means for measuring performance measurements within said
16	physical environment associated with said portable computer and for
17	inputting performance measurements into said portion of said computer
18	generated model in said portable computer.
1	29. The computerized system of claim 28 further comprising a means for
2	uploading said performance measurements from said portable computer to
3	said server.
1	30. The computerized system of claim 29 wherein said means for
2	measuring is a measurement device connected to said portable computer.
1	31. The computerized system of claim 28 further comprising a means for
2	downloading said performance measurements from said server computer
3	to said portable computer.

1	32. The computerized system of claim 28 further comprising a means for
2	uploading and downloading said performance measurements from said
3	portable computer to another computer which is different from said server
1	33. The computerized system of claim 32 wherein said means for
2	measuring is a measurement device connected to said portable computer.
1	34. The computerized system of claim 28 further comprising:
2	a means for inputting changes to at least a portion of said compute
3	generated model on said portable computer which is downloaded from
4	said server, said means for inputting being positioned on said portable
5	computer; and
6	a means for uploading said changes to said server.
1	35. The computerized system of claim 28 further comprising:
2	a means for inputting changes to at least a portion of said compute
3	generated model on said portable computer which is downloaded from
4	said server, said means for inputting being positioned on said portable
5	computer; and
6	a means for outputting predicted performance parameters of said
7	communications network based on said inputted changes on said display
8	of said personal computer.
1	36. The computerized system of claim 28 wherein said communications
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- 37. The computerized system of claim 28 wherein said portable computer
 is a hand-held computer.
- 1 38. The computerized system of claim 28 wherein said representation is
- 2 three dimensional.
- 1 39. The computerized system of claim 38 wherein said representation is
- 2 constructed from a series of two dimensional representations.
- 1 40. The computerized system of claim 28 wherein said physical
- 2 environment is a building and said pictorial representation includes at least
- 3 one floor plan of said building.
- 1 41. The computerized system of claim 40 wherein said representation
- 2 includes a plurality of floor plans for a plurality of floors in said building,
- and wherein said portable computer includes a means for selecting specific
- 4 floor plans of said plurality for displaying on said display.
- 1 42. The computerized system of claim 28 wherein said physical
- 2 environment is a campus of buildings and said representation includes at
- least one floor plan for each of a plurality of buildings in said campus, and
- 4 wherein said portable computer includes a means to select a building
- 5 within said campus of buildings and to display said at least one floor plan
- 6 for said building selected.

1	43. The computerized system of claim 40 wherein said representation
2	includes a plurality of floor plans for a plurality of floors for said building
3	selected.
1	44. The computerized system of claim 28 wherein said components are
2	selected from the group consisting of base stations, base station
3	controllers, amplifiers, attenuators, antennas, coaxial cabling, fiber optic
4	cabling, connectors, splitters, repeaters, transducers, converters, couplers,
5	leaky feeder cables, hubs, switches, routers, firewalls, power distribution
6	lines, copper wiring, twisted pair cabling, and wireless access points.
1	45. The computerized system of claim 28 wherein said physical
2	environment is an outdoor area having three dimensional topology and
3	said representation includes a representation of said three dimensional
4	topology.
1	46. The computerized system of claim 28 further comprising a position-
2	tracking device used to determine position within said physical
3	environment.
1	47. The computerized system of claim 28 wherein said communication
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2	network components are maintained in a bill of materials.
1	48. The computerized system of claim 28 further comprising:
2	a means for inputting changes to at least a portion of said compute
3	generated model on said nortable computer which is downloaded from

4	said server, said means for inputting being positioned on said portable
5	computer; and
6	a means for uploading said changes to another portable computer
7	that is different from said server.
1	49. The computerized system of claim 28 further comprising:
2	a means for inputting changes to at least a portion of said computer
3	generated model on said portable computer which is downloaded from
4	said server, said means for inputting being positioned on said portable
5	computer;
6	a means for uploading said changes to said server; and
7	a means for displaying and storing said changes at said server.
1	50. The computerized system of claim 28 further comprising:
2	a means for inputting changes to at least a portion of said computer
3	generated model on said portable computer which is downloaded from
4	said server, said means for inputting being positioned on said portable
5	computer;
6	a means for uploading said changes to another portable computer
7	that is different from said server; and
8	a means for displaying and storing said changes at said another
Q	nortable computer